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SCIENCE NEWS LETTER

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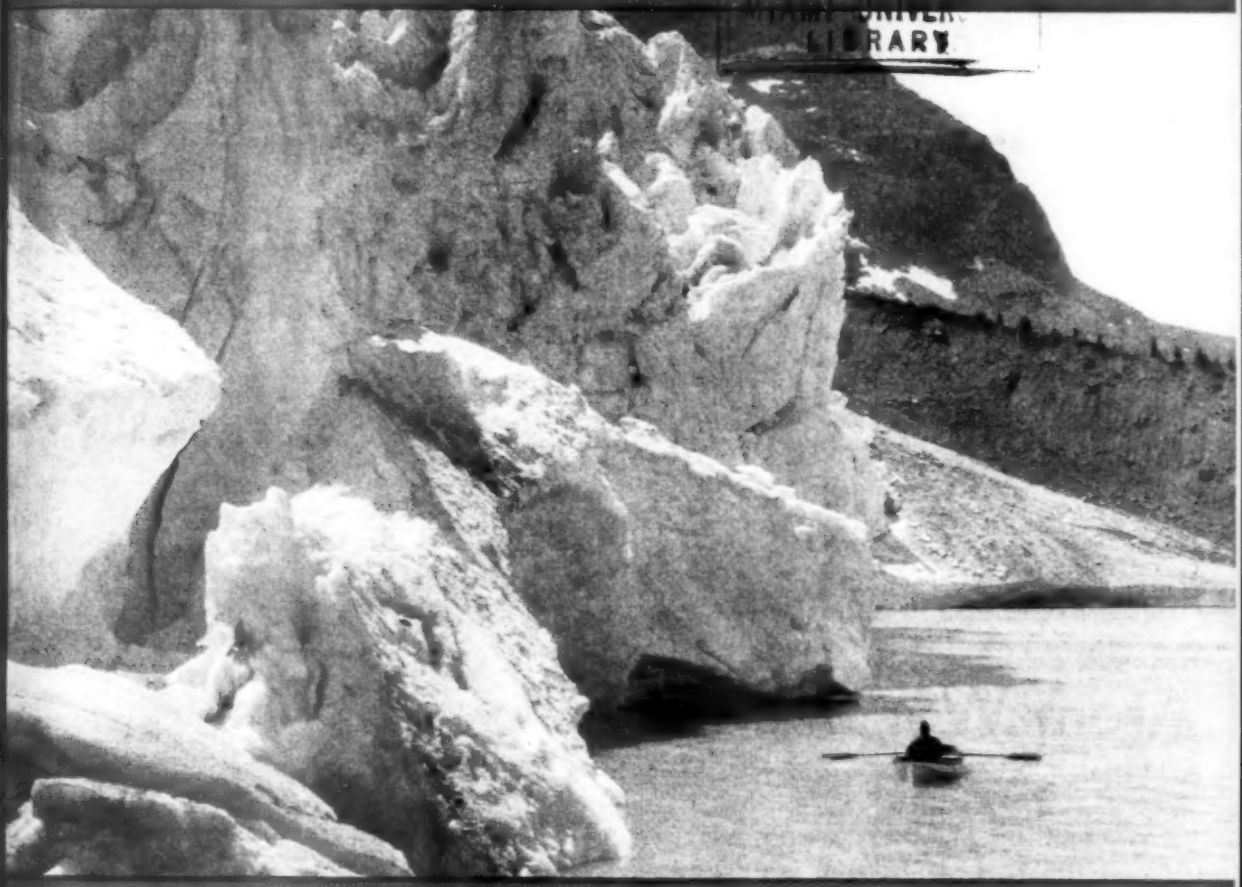

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Dating a Glacier

See Page 122

A SCIENCE SERVICE PUBLICATION

CHEMISTRY

Radioactive Poisons

➤ THE DANGER of radioactive pollution of rivers and lakes is not a simple matter of calculating the amount of waste that can be diluted, the Chemical Institute of Canada was told in Montreal.

Deposition of the radioactive materials in river and lake beds and their concentration in fish and other animals eaten by man is a danger that could send the radiation dose higher than international limits, Dr. J. F. Guthrie, Atomic Energy of Canada, Ltd., Chalk River, warned.

Waters that afford the liveliest fishing and are most attracive to the eye are low energy systems, more free from wastes that contain organic materials and minerals available to living creatures, Dr. C. E. Renn, Johns Hopkins University, Baltimore, reported at the meeting. Many species compete in less polluted waters, but as wastes are added the water quality becomes more varied and a larger population of more limited species develops.

Heating a stream, through discharge of industrial wastes into it, results in a substantial reduction of dissolved oxygen with increased biological activity such as growth of vegetation, Dr. Richard D. Hoak of the Mellon Institute, Pittsburgh, reported.

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PHYSIOLOGY

Animal Radiation Study

➤ HOPE THAT MAN can survive the dangers of radioactive fallout has been seen as a result of studies with rats.

Cesium-137, a comparatively little-studied fission product, was injected into rats after the animals were first irradiated with X-rays at the University of Cincinnati Medical Center, Dr. James G. Kereiakes told the First International Biophysics Congress in Stockholm. The aim is to determine the extent of distribution of radioactive cesium-137 in the body. Strontium-90 is a better-known fallout material that seeks the bone.

Simulating a fallout field where mammals might take in radioactive material internally by breathing, through the mouth or skin, and at the same time receive external radiation stress, Dr. Kereiakes irradiated his laboratory animals with X-rays and immediately injected the fallout material.

The animals were then studied for retention of cesium-137 and its distribution in their bodies. Control animals were given only cesium-137 injections.

The irradiated rats showed greater excretion of the cesium-137 than the control animals. Radiation exposure increases the amount of urine, the scientist explained, and this probably is related to the increased volume of excretion.

If these urinary losses of cesium-137 and the increased urinary volume are a related cause and effect, the possibility appears that cesium-137 can be flushed out of the contaminated animal. This hopeful possibility, Dr. Kereiakes said, will be studied further.

Collaborators on the research were Dr. David Ulmer of Harvard Medical College; Dr. A. T. Krebs of Fort Knox Army Medical Research Laboratory and Dr. T. D. Sterling, University of Cincinnati.

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PUBLIC SAFETY

Atom War Survivors

➤ "NORMAL AND HAPPY LIVES" are possible for the survivors of a thermonuclear attack, and the problems of national recovery from such an attack have been "grossly exaggerated," a military analyst and civil defense expert told the House military operations subcommittee.

Herman Kahn, consultant to the Rand Corporation, Santa Monica, Calif., said effective civil defense programs can be designed for the "less ferocious and less difficult" wars that he considers more likely than an "uncontrolled and all-out" war.

"Twenty million dead is better than 40 million dead," he said. "Let's save those who can be saved."

The subcommittee, headed by Rep. Chet Holifield (D.-Calif.), is weighing President Kennedy's $207,000,000 request for an expanded civil defense program.

The proposal includes $93,000,000 for a survey to identify and mark existing and potential shelters in public buildings. Mr. Kahn called this "one of the most justified expenditures" and said it should have been done in the 1950's.

He deplored what he called "the widespread view that what causes war is thinking about it. An incredibly large number of people believe that if you build shelters, you will have to use them."

He said the idea that limited wars are no longer possible is "naive," and pointed out that an enemy who destroyed the maximum number of persons in a first attack would no longer have "hostages" to threaten if he did not get his way.

The so-called "doomsday" weapons, threatening the end of the world, "have not been built, and there is good reason to believe that they will not be in the near future."

Mr. Kahn said he believed there is logic in the statement that "I would rather have everybody Red than everybody dead." The alternative to this attitude, he said, is to put the country "in a position where you can say you are willing to accept large casualties rather than surrender."

• Science News Letter, 80:114 August 19, 1961

PUBLIC HEALTH

Antipollution Bill Signed Into Law

➤ A STRONG BILL to fight water pollution has been signed into law by President Kennedy.

The bill will give stronger powers to the Federal Government in water pollution cases and increase Federal support for constructing waste treatment plants. It is a compromise version of two similar bills introduced in both the House and Senate.

The administration of the Federal water pollution control has been elevated to the office of the Secretary of Health, Education and Welfare, and would apply to all interstate and navigable waters. Enforcement procedures were previously limited to intracoastal waterways, administered by the Surgeon General of the U. S. Public Health Service.

The bill also authorizes construction grants totaling $570,000,000 through the 1966 fiscal year. During 1962, $80,000,000 will be available, $90,000,000 in 1963, with $100,000,000 annually for the following three years.

Other features of the bill include constructing field laboratories and research facilities, and storing reservoir water to flush out streams when water levels are low.

According to the bill, Federal action on intrastate waterways can be taken only when requested by a state or by a city with state approval.

Survey scientists make a comprehensive survey before recommending a possible test site. The area is thoroughly mapped, noting the type of rock and its tendency to resist tremendous shock. The circulation of ground and surface water is carefully checked to see whether any possible radioactive contamination would be spread to other regions.

• Science News Letter, 80:114 August 19, 1961

GENERAL SCIENCE

Many Science Aids Available in All Fields

➤ A NEW AID to youngsters and adults interested in science is now available.

Called Wonderful World of Science, the paperback book describes thousands of science materials which can be obtained free or at very low cost. These include booklets, films, kits, games and experiments in every scientific field, which have been prepared by professional organizations, Government and industry.

The Science Service-Bantam Book publication tells how to obtain materials covering everything from astronomy to zoology. This 50¢ source book was edited by Shirley Moore and Judith Viorst, with illustrations by Don Trawin.

• Science News Letter, 80:114 August 19, 1961

CHEMISTRY

Carbon-12 New Standard

Carbon atom weight 12 is the new standard for the chemical elements, Watson Davis reports from the International Congress of Pure and Applied Chemistry meeting in Montreal.

➤ A NEW STANDARD for the weight of all the building blocks of the universe, the chemical elements, has been settled after some years of bitter controversy with the selection of carbon atom weight 12.

All of the 103 known elements will be refigured, but the differences in the familiar periodic tables on schoolroom walls and in scientific books will not be apparent until the second decimal place in any case.

Oxygen atom 16 is dethroned as the standard. In fact, two oxygen standards are displaced. The chemists have in the past taken natural oxygen as 16 and the physicists have taken the isotope of oxygen 16 as bases. As there are three kinds of oxygen, isotopes 16, 17 and 18, in the natural oxygen in the air, there was a difference. Oxygen is now 15 followed by decimal 9994 with plus or minus one in the fourth decimal place.

The Council of the International Union of Pure and Applied Chemistry, meeting in Montreal, announced that they had joined the action of the equivalent union in physics taken previously on the carbon-12 base. There had been strong feeling for and against the change, not on national lines but depending upon the fields of science.

The international chemical body, with representation from all parts of the world, Communist as well, also straightened out nomenclature in thermodynamics so that formulas will be written the same the world over.

The standardization accomplished recalls that British, Canadian and United States scientists two years ago agreed on using the same length for the inch, which was equated to 2.54 centimeters. It changed the U. S. inch by four parts in a million, a matter of about six inches in the distance from Washington to New York.

The U. S. representative in the work on adoption of the carbon-12 standard was Dr. Edward Wichers, associate director of the National Bureau of Standards. Dr. A. W. Noyes of the University of Rochester, Rochester, N. Y., who is president of the International Union of Pure and Applied Chemistry, was also influential in adoption of the new standard.

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New Materials Sought

➤ BECAUSE MAN is reaching for space and even eventually to the stars, extremely high temperatures were considered at the International Congress of Pure and Applied Chemistry in Montreal.

The search for new materials is directed to substances that will withstand both the extreme heat of rocket travel and the sub-icy cold of empty space, as well as the rigors of temperature in nuclear reactors and plasmas generated in attempts to harness the thermonuclear H-bomb for power. The high temperatures of most interest extend from about 3,700 degrees Fahrenheit to hundreds of thousands of degrees—the lowest range of which is far above where steel glows white hot.

The existence of complex gaseous compounds that are not analogous to those in solids or liquids has been demonstrated.

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LIGHTWEIGHT PLANE—A thin skin of polyester resin and fiberglass covers the Avian 2/180 gyroplane. The covering, having unusual strength and light weight, was made by the Hooker Chemical Corporation, Niagara Falls, N. Y.

Light Shows Food Poisons

➤ SOME POISONS sprayed on foods to combat insect pests can be made to signal their danger by the light they give off when flooded with ultraviolet radiation.

The International Congress of Pure and Applied Chemistry in Montreal was told by Dr. D. MacDougall of the Chemagro Corporation of Kansas City that fluorescence measurements have higher sensitivity than other methods, but can be applied only when the chemical itself is fluorescent or can be made to produce a compound that has this effect.

Increasing stringency of control regulations of many governments has caused chemists to search for new and better analytical methods for detecting the residues of pesticides left in food.

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Tantalum Carbide Lights

➤ BY USING TANTALUM carbide instead of tungsten in electric lamp filaments, a bulb that gives one-half again as much light and lasts up to twice as long has been produced.

Research on the new high brilliancy lamps was reported to the International Union of Pure and Applied Chemistry in Montreal by two scientists from Polaroid Corporation, Cambridge, Mass., Dexter P. Cooper, Jr., and George R. Bird. Although not yet manufactured, the new lamps are expected to be particularly useful in projectors for slides and films because the screen brightness depends on the actual brightness of the filament's surface.

The new tantalum carbide filament burns at a temperature of about 6,000 degrees Fahrenheit, whereas ordinary projector lamps burn at about 5,500 degrees Fahrenheit. The new lamps burn 24 hours, it is claimed, compared with 10 to 12 hours of presently used lamps.

One of the problems in the perfection of the new lamp was to find an atmosphere that would allow tantalum carbide to be heated to high temperatures and remain stable. Suitable gaseous atmospheres consisting of hydrocarbons and hydrogen were devised.

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Waste Lignin for Tires

➤ BY USE OF LIGNIN, a waste product in paper manufacture comprising a large percentage of wood, satisfactory tires can be made with a reduction of the crude rubber content of 10% to 40%.

This chemical result was announced to the Chemical Institute of Canada in Montreal by a team of Canadian chemists from the National Research Council, Ottawa, the Howard Smith Paper Mills, Cornwall, Ont., and the Army Development Establishment, Ottawa, consisting of T. R. Griffiths, D. W. MacGregor and Lloyd Krichew.

Lignin is used in both the carcass and tread of large diameter tires of nylon cord construction.

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PSYCHOLOGY

Broken Homes Cycle

➤ PARENTS from broken homes tend to have children who produce broken homes when they become parents, thus creating a vicious cycle, an English psychiatrist has found.

He studied 185 children from four to 15 years old in a London County Council child guidance unit (Brixton). In only 41 cases did the child and both parents come from an unbroken home. Previous studies have demonstrated that delinquent children come from broken homes, but the parents' own home background has not been investigated.

Dr. C. J. Wardle, now consultant in child psychiatry for North Lincolnshire, made his one-year investigation while he was at Bethlem Royal and Maudsley Hospitals near London.

Dr. Wardle's study showed "significant differences" in symptoms between children with one parent who had suffered a broken home in childhood and those with both parents apparently from intact homes.

Where parents had unbroken childhood homes, only 24% of the children showed disorderly conduct (defined as delinquent, antisocial or aggressive). But 68% behaved neurotically, that is, they showed anxiety, depression, timidity, obsessional features, shyness or inhibition.

In contrast, where at least one parent had suffered a broken home in childhood, 52% of their children showed disordered conduct and only 34% presented neurotic behavior.

Dr. Wardle suggests that a register of all children from broken homes be compiled and that such children be supervised and followed into adult life. By understanding treatment these children can achieve socially and mentally healthy lives, he reports in the British Medical Journal, Aug. 5, 1961.

Information is needed, the psychiatrist states, about the proportion of children from broken homes who develop normally. Foster homes and children's homes in this way could be helped to copy the rearing pattern.

• Science News Letter, 80:116 August 19, 1961

MEDICINE

Fatal Heart Cases Up

➤ THE ANNUAL number of deaths from heart disease, the nation's number one killer, increased by 23,785 in the two-year period from 1957 to 1959, the National Health Education Committee reported in New York.

Diseases of the heart and circulatory system caused 915,610 deaths in 1959, compared with 891,825 from the same causes in 1957.

The 1959 heart fatality total included 511,640 from arteriosclerosis alone, 247,530 from cardiovascular conditions involving both arteriosclerosis and hypertension, and 80,800 from hypertension. These three causes accounted for 92% of the heart-linked deaths.

The 915,610 deaths made up 55% of the 1,659,000 deaths in the United States from all causes in 1959. An additional 11,917,000 persons were disabled in varying degrees by diseases of the heart and circulation, making these afflictions second only to mental and emotional disorders, with 17,000,000 reported, as a leading cause of disability.

Cancer, the second ranking killer, also increased its toll slightly, from 253,183 deaths in 1957 to 259,090 deaths in 1959. Cancer accounted for 16% of the overall total.

Other major death causes included accidents, five percent; diseases of early infancy, four percent; influenza and pneumonia, three percent; diabetes mellitus, two percent; congenital malformations, one percent; cirrhosis of the liver, one percent; suicides, one percent; and tuberculosis, seven-tenths of one percent.

Despite the deaths and illnesses, the American life span reached 69.7 years in 1959, an increase of six and four-tenths years since 1943. White females are living six and one-half years longer than white males, and non-white females four and nine-tenths years longer than non-white males.

The national death rate declined 17% from 1937 through 1959, and 11% from 1945 through 1959—an estimated saving of 4,494,736 lives that would have been lost had the 1937 death rate prevailed for the 22 years following.

Mrs. Albert D. Lasker, committee chairman, points out that only seven-tenths of one percent of the Government's annual expenditures goes for medical research. Appropriations to the National Institutes of Health for fiscal 1961 were $560,000,000, compared to the total U. S. Budget of $79 billion.

The committee's biannual report, "Facts on the Major Killing and Crippling Diseases in the United States Today," is available at $5.25 a copy from the National Health Education Committee, 135 E. 42nd St., New York 17, N. Y.

• Science News Letter, 80:116 August 19, 1961

MEDICINE

Lincoln's Smallpox Scare Kept Visitors Away

➤ PRESIDENT Abraham Lincoln was in the incubation stage of smallpox when he delivered the Gettysburg address, but his attack later was mild.

This little known bit of Lincolnia was uncovered by Charles Roos of the National Library of Medicine, Washington, D.C., during research on U.S. presidents' health.

"When unwelcome visitors came to the White House for a long time afterward, Lincoln would scare them away with his smallpox although it had long since passed the danger of infection to others," Mr. Roos told SCIENCE SERVICE.

The Journal of the American Medical Association, published in Chicago, carries a lead editorial on the health of the presidents, 177:324, 1961.

The swampy ground around the White House was a breeding ground for the *Anopheles* mosquito, which causes malaria, and this disease as well as "dysentery" afflicted most of the early presidents.

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BIOCHEMISTRY

Chemical "Brain" DNA

➤ THE CHEMICAL "brain" of a virus that orders the creation of more viruses has been isolated for the first time. It is not like a real brain, but is the chemical unit that gives instructions for formation of another virus.

The chemical is deoxyribonucleic acid, or DNA. It is a double-strand "brain," shaped like two intertwined corkscrews, and can be isolated from the virus and transplanted into a new host cell where it begins to function again.

The discovery gives scientists a system that they can control in their search for clues to the basic genetic code governing the production of living cells. It was reported to the Fifth International Congress on Biochemistry in Moscow.

Drs. Earl Evans Jr., Roy P. Mackal and Franz Meyer, all of the University of Chicago, have shown for the first time that DNA by itself can command a complete new cell. The "assistance" of proteins or ribonucleic acid is not necessary.

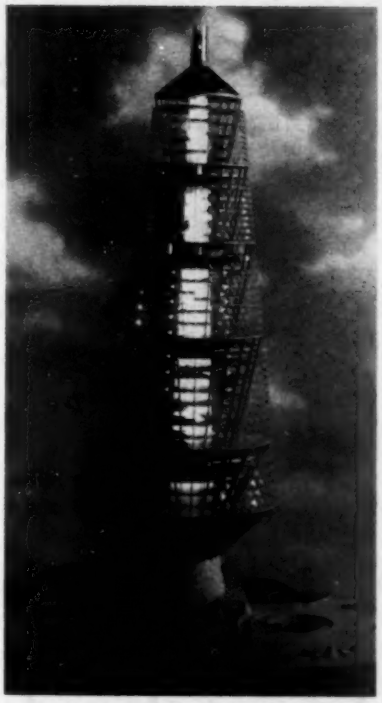
DNA is thus shown to be identical with the genetic matter of the cell. It was isolated from the virus known as lambda. Examination of the chemical properties of the lambda DNA shows that it resembles those of the DNA found in the genes of living cells in possessing double helical structure.

"This is the first time that a DNA having a double helical structure has been shown to be infectious," the biochemists said.

Before any major claims can be made for the code-breaking capability of the double-stranded lambda virus DNA, attempts must be made to do the "deciphering job," they said. Theoretically, with each variation that is made in the test tube in DNA's chemical structure, a similar change will result in the type of protein manufactured.

They said the laboratory work took advantage of the knowledge that the lambda virus "languishes inside an intestinal bacillus of man in another chemical form, called a 'provirus'."

• Science News Letter, 80:117 August 19, 1961



CRYSTAL SHOW PLACE—A crystal palace containing five exhibit halls surrounding a core over 1,000 feet high is slated to become the showplace for British industry. The $30,000,000 project will have 1,000,000 feet of floor space.

BIOCHEMISTRY

Mitochondrion Explained

➤ A FULL ACCOUNT of an eight-year study of the mitochondrion—a key biochemical machine that is the principal energy provider of all oxygen-using cells—has been given by Dr. D. E. Green, University of Wisconsin professor.

When enlarged a million times, the mitochondrion looks like an enlongated cake in which large numbers of raisins are embedded in regular array, Dr. Green told the International Congress of Biochemistry in Moscow. The raisins are the elements that do the work of the mitochondrion, and the cake is the structural network in which the raisins are mounted and supported.

"Each such raisin," Prof. Green said, "is known as the elementary particle, which is the complete functional unit. There are some 17,000 such units in a single mitochondrion of beef heart."

These particles carry out the complete oxidation of pyruvic acid (an acid normally produced in the body during a stage in the breaking down of carbohydrates or proteins) to carbon dioxide and water. During this combustion process, energy of oxidation is converted to chemical energy that is stored in the chemical, adenosine triphosphate or ATP.

Prof. Green said that in the structural arrangements he described as raisins in a cake, the raisins differ from one biochemical machine to another but the cakes in which these particles are embedded are much the same in design and arrangement.

"Two elements make up the cake," he said, explaining that a special protein known as the structural protein, which is a huge polymer (a long molecule) is intricately tied up with lipid. The biochemical raisins are imbedded within this matrix of structural protein and lipid, and the matrix serves to keep the functional elements in just the right shape and posture to do their work properly.

Prof. Green said "the elementary particle has a kind of bucket brigade for moving electrons from pyruvic acid to oxygen," which is a basic step in the oxidation of sugar. At least 11 different components are lined up in sequence to make up this chain.

"If we think of the oxidation of pyruvic acid as the transfer of electrons from pyruvic acid through the chain and finally to oxygen," he said, "then in the passage of a pair of electrons through this chain, three molecules of inorganic phosphate are converted to the terminal phosphate groups of ATP."

Some of the most important biochemicals have a place of honor on this chain, Prof. Green said. They include flavin, one of the B vitamins; heme, the active component of red blood cells; iron in a form other than heme iron; copper, and a newly discovered benzoquinone called coenzyme Q.

• Science News Letter, 80:117 August 19, 1961

PUBLIC HEALTH

One-Sided Gum Chewers Get "Jaw-Joint" Earache

➤ IF YOU MUST chew gum, be sure to chew on both sides of the mouth. Otherwise you may get "jaw joint syndrome."

Dr. Robert D. Ralph, an ear doctor at Group Health Association, Inc., Washington, said people who chew gum to relieve tension (consciously or unconsciously) usually chew on one side only.

After two or three hours of doing so an earache results in the opposite ear, Dr. Ralph explained, "since the ear canal and the jaw joint receive their nerve supply from a common source."

The tenderness in the ear disappears quickly when patients start chewing their gum on both sides of the jaws. In the meantime, the otologist said, aspirin will relieve the earache.

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MEDICINE

Computer System Seen for Hospitals

➤ A COMPUTER SYSTEM to replace expensive manual records was proposed at the International Conference on Medical Electronics in New York.

Dr. Mark S. Blumberg of Stanford Research Institute, Menlo Park, Calif., said that about five percent of a hospital's budget is spent on manual systems to be sure that nurses fill the doctors' orders, particularly those for medicine.

A Hospital Indicator for Physicians' Orders (HIPO) will soon be a necessity, Dr. Blumberg believes. Not only is the present system expensive, it allows opportunity for error.

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TECHNOLOGY

Transoceanic TV System

➤ A TELEVISION transmission system reportedly developed at a cost of about $1,000 was demonstrated by an inventor who claims it can be adapted to low-priced transoceanic telecasts.

The system built by Dr. Sid Deutsch, associate professor of electrical engineering at Polytechnic Institute of Brooklyn, employs shortwave broadcasting, rather than microwave relay stations such as those proposed for communications satellites.

Instead of the signals of 4,000,000 cycles per second used in conventional television, the Deutsch equipment uses only 45,000 cycles per second. A spot of light moves horizontally across the picture tube at 20 cycles per second and vertically at 2,250 cycles per second, compared with 15,750 cycles horizontally and 60 cycles vertically in conventional television.

The coarse movements are received clearly because of a "pseudo-random" scanning device, so called because of its "hop, skip and jump" kind of motion. The scan and a yellow-colored screen eliminate flickering. A transoceanic telecast by shortwave would be rebroadcast on home screens in black and white.

Dr. Deutsch said the picture quality is somewhat inferior to standard television, but equivalent to shortwave signals originating in Europe and rebroadcast locally. The slow scan makes 1.6 seconds necessary for a complete fadeout, leaving a ghost-like image visible after a quick motion.

The system was developed primarily to record classroom lectures inexpensively with a stationary camera. Lectures and laboratory demonstrations can be recorded on a standard dual-channel tape recorder with the tape running at 30 inches per second, rather than the usual 15.

Dr. Deutsch said he spent $800 for a standard closed-circuit system and about $200 to convert it for shortwave transmitting.

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SPACE

Space Treaty Needed

➤ THE LATEST Russian space shot has again shown the need for an international space treaty.

With the United States and Russia taking turns cluttering up outer space with satellites, manned space flights and other rocket shots, some international agreement is necessary yet no significant steps are being taken.

Most legal experts think such a treaty is premature because so little is known about the uses of outer space and the political, technical and military implications involved. Such questions as how far into space does national sovereignty extend and what is the definition of "peaceful uses" of outer space are still highly controversial.

In the peace and quiet of pre-satellite excursions, the question of national sovereignty was settled by a 1944 international agreement that stated every state has complete and exclusive jurisdiction over the air space above its territory. Although "air space" was never defined, flights during that time were primarily limited to the conventional propeller-driven planes whose "space heights" were limited to thousands of feet.

Since then, rocket shots as well as the U-2 and rocket-driven airplanes such as the X-15 have further muddied the picture of where national air space ends and outer space begins.

The United States stand has been and continues to be that the use of space should be limited to "peaceful purposes." However, the definition of "peaceful uses" also runs into a snag because of the current threat to national security. The development of the military early warning and reconnaissance satellites is considered an integral step in the defense of the country, yet one reconnaissance satellite jaunt over Russia has already brought cries of "acts of aggression" from Russia.

The dividing line between military and non-military uses of outer space is very fine—for instance, information from weather and communication satellites can also be used by the military.

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MINING

Methane Gas Affects Coal Dust Explosibility

➤ THE EXPLOSIVE FORCE of a mixture of coal dust and air resulting from the presence of a small amount of methane gas depends upon the concentration of the dust in the atmosphere.

Experiments on the effects of adding varying amounts of combustible gas to coal dust were conducted by the U. S. Bureau of Mines. The experiments were carried out in laboratory-type test chambers and the effects of changes in pressure and convection currents within the chamber were also studied.

Some of the conclusions are applicable to any combustible gas in a potentially explosive dusty atmosphere and also are important to industries other than coal. The report on "Explosibility of Coal Dust in an Atmosphere Containing a Low Percentage of Methane" by John Nagy and William M. Portman can be obtained from the Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa.

• Science News Letter, 80:118 August 19, 1961

SPACE

Yo-Yo De-Spin Device Will Slow Satellites

➤ A YO-YO mechanism may soon be used to slow down the spin of satellites.

The mechanism consists of two pieces of wire with weights on the ends. The wires are symmetrically wrapped around the middle of the satellite and the weights are fastened by a release device.

At a predetermined time, after the satellite has separated from the launching vehicle and is spinning in space, the weights are released and the two Yo-yo's reduce the spin of the satellite to the proper spin.

Dr. J. V. Fedor of the Goddard Space Flight Center calculated the theory and design curves of the de-spin mechanism for the National Aeronautics and Space Administration, Washington, D. C.

• Science News Letter, 80:118 August 19, 1961

PORTABLE FIRE SHELTER

PUBLIC SAFETY

Fire Shelter Developed Of Aluminum Foil

➤ A PORTABLE tent shelter that protects trapped forest firefighters from searing heat has been developed by U. S. Forest Service researchers.

Weighing about two pounds, the aluminum foil shelter with fire-resistant cotton netting and paper insulation comfortably shields its occupant, even when outside temperatures reach more than 600 degrees Fahrenheit.

Easily carried rolled up in a packet, the emergency shelter can be unrolled and wrapped around the firefighter within seconds, it is reported in Agricultural Research, 10:6, 1961.

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SPACE

U.S. Racing USSR in Space

➤ UNITED STATES SPACE efforts are on the way to major achievements with the future possibility of equaling and surpassing the Russian manned orbit flights.

But the decisions were made some years ago that accented missiles for defense rather than man-carrying space flights.

Big boosters to send men into space are now being developed in the United States.

The space programs succeeding today have been in the making two to five years.

It is not possible to jump ahead suddenly in space merely by pouring more money or manpower into new projects or those already under way. A certain amount of "lead time" from when a project is begun until a device has been tested completely is necessary.

A good example of the painstaking efforts that go into such projects is the Atlas, scheduled to carry the first orbiting U.S. astronaut three times around the earth.

The Atlas missile has persistently given trouble. Last time when fired in May it malfunctioned and had to be destroyed shortly after launch. After such a failure all the information recorded by the telemetering equipment must be studied painstakingly to pinpoint the cause of trouble.

Solving engineering and scientific problems takes highly skilled experts who must have the required time to do research and development work on a device.

The U.S. public, as well as many scientists and Congressmen, question why the U.S. is behind in space technology today and who is responsible. The responsibility is divided among boards of advising scientists, budget specialists and Congress.

The U.S. is far ahead of Russia in scientific satellites giving information about weather conditions, problems of the space environment and re-entry, as well as of the composition of space itself.

Russia has been invited to share U.S. satellite information as have other countries of the world. After the weather satellite Tiros III was recently launched, 100 countries, including Russia, were invited to participate in an exchange of weather information. So far Russia has not accepted as she did not when Tiros II went aloft and a similar invitation was made.

To follow the second Russian cosmonaut, Maj. Gherman S. Titov, who circled the earth 17 times in an orbit 110.5 to 160 miles away Aug. 6 and 7, the Russians plan orbiting several men around the earth in about two months. The moon is the next step. The U.S. plans to orbit a man before the end of the year, send three men in orbit in 1965 and is shooting for a moon orbit in 1967 at the earliest.

Maj. Titov traveled about 435,000 miles in 25 hours and 18 minutes in his 10,430-pound craft at 17,750 miles an hour, proving effectively that man can endure weightlessness over long periods. This is one of the prime aims of orbital test space flights of U.S. astronauts.

Whether the U.S. will soon catch up with Russia in large booster production may depend on this country's present and future planning. President Kennedy has recommended that as much research as possible be carried on in several programs trying for success at the same time, instead of first one approach, then another being explored.

He suggested that the National Aeronautics and Space Administration might carry on research with liquid rocket fuels for the big boosters necessary for deep space flights while the Air Force experiments with solid rocket fuels.

The Nova rocket scheduled at this time for the moon trip will consist of a cluster of eight F-1 liquid fuel rockets with a combined 12,000,000 pounds thrust. Twenty to 24,000,000 pounds of thrust would be necessary in a similar booster using solid rocket fuel because the solid fuel has a shorter burning time.

• Science News Letter, 80:119 August 19, 1961

SPACE

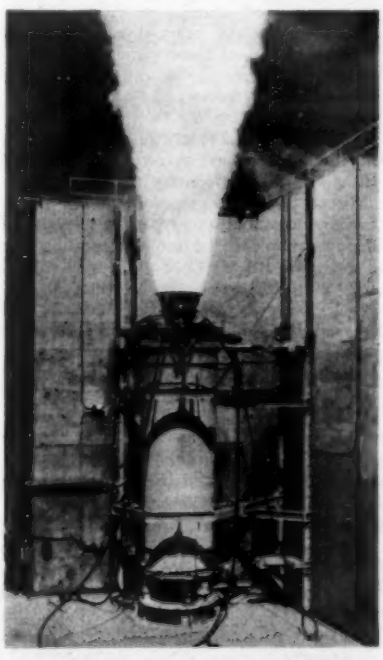
Motor Clears Way For Big Boosters

➤ A SOLID FUEL rocket motor that clears the way for the production of single rockets with up to three million pounds thrust has been tested. By clustering such motors, a booster vehicle could achieve thrusts up to 25 million pounds.

United Technology Corporation, Sunnyvale, Calif., tested the motor for 80 seconds, in which time 40 tons of fuel were burned up in the motor's three segments. The motor developed up to 250,000 pounds of thrust.

The segmented engine, 26 and one-half feet long, is the first of its kind fired in a lightweight steel casing. Previously, only heavy-walled test casings unsuitable for flight have been used.

• Science News Letter, 80:119 August 19, 1961



ROCKET MOTOR FIRED

SPACE

Women Found to Stand Hot Space Trip Better

➤ IT WOULD be easier for women to stand high temperatures inside a spacecraft in flight than it would be for men, Dr. D. R. Kenshalo of Florida State University, Tallahassee, Fla., maintains.

He said experiments show men should be comfortable in space if their skin temperature does not exceed 97 degrees Fahrenheit, which requires a spacecraft temperature of 104 degrees. Women, however, should be comfortable with maximum skin temperatures of 102 to 104 degrees, requiring a spacecraft temperature ranging from 120 to 130 degrees Fahrenheit.

Dr. Kenshalo and his associates tested 15 men and 15 women under controlled changes in temperatures and humidity, measuring alterations in human temperatures with thermodes attached to the skin surface of the arm. Their research will continue under a recent $21,510 grant from the National Aeronautics and Space Administration.

If ways can be found to enable man to tolerate higher temperatures, Dr. Kenshalo pointed out, it would be possible to eliminate "a ton or so of instrumentation" now thought necessary for human comfort on a long space flight.

• Science News Letter, 80:119 August 19, 1961

SPACE

Space Race Effort Called "Science at Its Worst"

➤ THE ATTEMPT to beat the Russians to the moon is termed "science at its worst" by a Cleveland, Ohio, physician.

Dr. Irvine H. Page of the Cleveland Clinic, Cleveland, calls using scientific research to win political races "prostituting one of man's most valued functions." He states that science is being used "to develop a war image" and that politicians, not scientists, have made outer space synonymous with war.

Writing in Modern Medicine, July 10, 1961, which he edits, Dr. Page tabs the space race "utterly pointless." People in underdeveloped countries who "can't read, have no radios, and haven't enough to eat" are more concerned with their own survival than with outer space research and the news of the latest astronaut or cosmonaut.

Western appeal to the world, he suggests, should be based on "our magnificent contributions in medicine and science." As part of this "rich heritage," he cited development of important drugs, vaccines, surgical methods and research programs on disease.

• Science News Letter, 80:119 August 19, 1961

ENTOMOLOGY

Beetle Splatters Blood To Fight Enemies

➤ A TINY BEETLE routs his enemies by splashing them with his own sticky blood.

The Mexican bean beetle, *Epilachna varivestis* Mulsant, bleeds at the leg joints whenever he is attacked by his enemies such as ants. The blood, forming as tiny droplets, spreads over the ant and leaves him squirming in a molasses-like substance.

During laboratory tests, Mexican bean beetles artificially prodded bled only at the leg joints closest to the source of irritation, Drs. George M. Happ and Thomas Eisner, Cornell University entomologists, report in Science, 134:329, 1961. When the stimulus was repeatedly applied to the same site, the bleeding spread to the other legs.

"The amount of blood that the beetles can stand losing is considerable," the scientists note. "No noticeable ill effects result from a loss of six droplets," which is a lot of blood for a tiny beetle.

Attacking ants doused with the beetle's blood would immediately back away and begin washing themselves intensely. The ants eventually recover although it may take from several minutes to more than an hour to clean themselves thoroughly, the scientists state.

• Science News Letter, 80:120 August 19, 1961

MEDICINE

Lung Cancer Study Shows Cigarettes Major Cause

➤ "ALREADY OVERWHELMING EVIDENCE" that cigarette smoking is a major factor in the cause of lung cancer has been "greatly" strengthened by a new study reported in The New England Journal of Medicine, 265:253, 1961.

More than 83,000 punch cards were used to record data on autopsied sections of tissue taken from the air passages (tracheo bronchial tree) of 402 men who died of various causes in several eastern hospitals.

Of 63 who had died of lung cancer, 55 had regularly smoked cigarettes up to the time of diagnosis, five smoked cigarettes regularly but had stopped before diagnosis, one had smoked both pipe and cigars regularly and one smoked cigars regularly.

The remaining 339 men who died of other causes, including several types of cancer, had not worked in occupations for which extremely high rates of lung cancer had been reported. However, some of them had been exposed to air pollutants in such jobs as painting and automobile mechanics' work.

Fifty-five of the men had never smoked regularly, but 143 had smoked from one to two packages of cigarettes a day, 36 smoked two or more packages a day, and the others smoked up to one-half a package a day.

Abnormal cells were found in the bronchial tissues examined among all smokers, whether or not they died of lung cancer.

In this study Drs. Oscar Auerbach and A. P. Stout of the East Orange Veterans Administration Hospital, N. J., with Dr. E. Cuyler Hammond and Lawrence Garfinkel of the American Cancer Society, New York, found one or more of certain types of tissue changes more frequently among those who had smoked. The changes included destruction of cilia or of the entire hair-fringed cells, an abnormal number of normal cells (hyperplasia) and abnormal cells, all of which greatly increased in proportion to the amount of cigarette smoking.

• Science News Letter, 80:120 August 19, 1961

MEDICINE

Ancient Egyptians Had Today's Diseases

➤ THE PEOPLE of ancient Egypt were subject to most of the same afflictions that plague mankind today, ranging from bedsores to hydrocephalus, Dr. J. T. Rowling reported to the Royal Society of Medicine in London. New techniques of X-ray examination have made possible the discovery of hitherto undetectable information.

The Pharaoh Siptah suffered from "club foot," while Rameses V appears to have had smallpox. Many other afflictions have been detected in mummies, including pneumonia, appendicitis, gallstones and tuberculosis.

Two ailments not found were syphilis and a particular deformity of the big toe probably lacking because of a characteristic of the Egyptian sandal.

• Science News Letter, 80:120 August 19, 1961

MEDICINE

Heart Ailment Caused By Experimental Drug

➤ AN EXPERIMENTAL DRUG used to treat advanced cancer in nine patients caused unexpected heart disease in three.

The reaction of these patients with far-advanced cancer to the drug, tried only after all other treatment had been exhausted, was a "surprise" to the two doctors administering Psicofuranine. They warn that heart disease caused by other experimental drugs could be a "serious problem."

From taking Psicofuranine, both orally and by injection, three patients developed inflammation of the sac surrounding the heart, Drs. Robert C. Yates and Kenneth B. Olson of Albany Medical Center, Albany, N. Y., report in The New England Journal of Medicine, 265:275, 1961. The reaction stopped four or five days after the drug was withdrawn and was not believed to have made the patients any worse.

Psicofuranine is an antibiotic, known chemically as 6-amino-9-D-psicofuranosylpurine. It is successful in the laboratory as an antitumor drug, among other uses.

"It seems doubtful if this drug will have any place in therapeutic medicine," the physicians state, "but with the host of antibiotics and antitumor agents being tested and developed, drug-induced pericarditis may be seen again and may be a serious problem."

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IN SCIEN

MEDICINE

Theory of Insulin Control of Diabetes

➤ A CONTROVERSIAL theory of how insulin controls diabetes was described by a University of Maryland professor at the Fifth International Congress on Biochemistry in Moscow.

How insulin actually works in the body has never been clarified despite successful isolation of the hormone from pancreatic tissue for control of diabetes some 40 years ago, Dr. Samuel P. Bessman of the University's School of Medicine, Baltimore, said. The body hormone, which is necessary to prevent diabetes, affects the absorption of sugar but equally affects the production of starches and fats.

Dr. Bessman discussed the relationship of his own findings to the broader problems of protein synthesis and the release of cellular energy in the body. He believes that insulin may act as a "metabolic clutch" in releasing energy within living cells.

His theory is that insulin binds tryptophan, a protein building block, to muscle protein. It acts, he believes, to connect mitochondria to the enzyme in the cell. By making the mitochondria more efficient, the insulin gives all cells a boost.

Mitochondria are little particles in the cell that generate energy in usable form as metabolic fuel. They are a mobile power unit, but they have to be near to what they give power. A special enzyme in the cell is needed to get the particles operating.

This enzyme is usually free in the cell, and it is Dr. Bessman's theory that insulin connects this enzyme to the mitochondria.

• Science News Letter, 80:120 August 19, 1961

AGRICULTURE

West African Swamps Useful in Rice Production

➤ RICE PRODUCTION in West Africa can be increased by millions of acres to supply a much needed source of food.

N. Parthasarathy, a rice expert of the Food and Agriculture Organization of the United Nations (FAO) in Rome, found that development of vast areas of swamp mangroves along the West African seacoast and in the deltas further inland would provide productive land for extensive rice cultivation. However, problems to be overcome include the reluctance of farmers to settle in these areas, the need for large scale mechanization, and the lack of storage and marketing facilities once the rice is harvested.

Experimental stations have been established by FAO for research into rice production in Senegal, Sierra Leone, Nigeria, Ghana, the Ivory Coast and other areas of West Africa.

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NE FIELDS

ENGINEERING

Coding Chopped Chatter Boosts Phone Traffic

▶ TELEPHONE users who call nearby Passaic, N. J., from Newark are having their voices "sliced" and translated into a mathematical code of high-speed electronic pulses.

The experimental Bell Telephone Company system sends 1,500,000 pulses over the wires per second, increasing the message capacity greatly.

Samples of a user's voice are taken about 8,000 times a second, coded as pulses, and rebuilt at the Passaic end of the line, sounding just as usual to the party being called.

The technique is called PCM, for "pulse code modulation." The Newark-Passaic routing is called the T-1 system.

Because high-frequency pulses tend to "decay" en route, booster amplifiers are located every 6,000 feet along the line to rebuild the coded signals and send them on to the next relay point.

T-1 was designed to serve metropolitan area lines up to 25 miles. Since existing cable can be used in making the change-over, it is expected to be a boon to large cities where room for more underground cables is scarce.

T-1 was developed by Bell Telephone Laboratories at Murray Hill, N. J., and Merrimack Valley, Mass.

• Science News Letter, 80:121 August 19, 1961

MEDICINE

Lymphocyte May Prevent Successful Skin Grafts

A PARTICULAR TYPE of white blood cell known as the small lymphocyte may prevent the successful grafting of skin, kidneys or other tissue from one individual to another.

This kind of white blood cell has been identified as the culprit in causing a breakdown of tissues transplanted between individuals other than identical twins.

The fact that white blood cells are implicated in the body's rejection of tissue not recognized as its own has been generally accepted. But which one of the several types of white cells played the leading role was not known. In fact, the function of the small lymphocyte has been a mystery.

In research at the University of California, Los Angeles, Medical School, Drs. William H. Hildemann, William D. Linscott and Mrs. Margaret Morlino injected purified small lymphocytes from adult mice of one strain into newborn mice of another strain. The white cells of the newborn had not yet developed the ability to distinguish foreign cells from their own. Thus they did not react against the injected cells. However, the white cells from the adult mice attacked the tissues of the newborn and caused the animals to die within a few weeks.

It is now evident that the mature small lymphocyte is by itself competent to cause the homograft reaction, that is, to destroy tissue from another individual it recognizes as foreign.

Dr. Hildemann said that only from a more detailed knowledge of the cells and mechanisms involved in the homograft reaction in all its forms will it be possible to approach the goal of making tissue homografts acceptable to adult humans who would otherwise react against them.

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AGRICULTURE

Cows Give More Milk When Pastures Improved

▶ INCREASING GRASS production in pasturelands increases milk production.

Showing dairy farmers in Brazil's Rio Grande do Sul how to increase grass production was one of the major aims of Ejnar Faber, a Danish dairy production expert of the Food and Agriculture Organization of the United Nations (FAO), who spent three years in the Pelotas area in conjunction with a UNICEF project to supply milk to undernourished children in the northeast region of Brazil.

Range production was increased to about five times by introducing forage plants, including grass seeds (tall fescue) from the United States. Cattle in the State of Rio Grande usually have enough grass for only six months of the year and survive on a semi-starvation diet for the rest of the year. With a constant supply of food, milk production was increased from about 100 gallons per year per cow to about 450 gallons.

The program also included a study of milk hygiene, herd sanitary problems and disease control in animals.

• Science News Letter, 80:121 August 19, 1961

ORNITHOLOGY

House Wrens Choose Red or Green Boxes

▶ BIRD LOVERS who want to attract house wrens to their yards should paint the nesting boxes red or green.

This advice results from an 11-year study by Dr. Robert A. McCabe of the University of Wisconsin in which he built red, yellow, blue, white, and green nesting boxes for house wrens. Using the out-of-doors for a laboratory, he constructed 98 nests of these colors, then rotated their positions in order to determine the basis of choice on color alone.

House wrens were lured most to the red or green boxes. White was the least popular hue. Most scientists believe that birds can differentiate between various colors, although the range of colors they can tell is limited.

Knowledge of the color awareness of birds is valuable from an evolutionary standpoint, and is also useful for pest control devices, Dr. McCabe reports in The Condor, 63:322, 1961.

• Science News Letter, 80:121 August 19, 1961

PUBLIC HEALTH

Smoker's Cough Often Lung Cancer Warning

▶ DO NOT IGNORE a smoker's cough. It is a warning that could save a life, an expert advises.

The smoker's cough serves a purpose in sending some affected persons to their doctors for early treatment that may prevent serious illness such as lung cancer.

Studies by a statistical research expert of the American Cancer Society, Dr. E. Cuyler Hammond, show that giving up the smoking habit may also prevent other smoking-caused illnesses from becoming serious.

The death rate from coronary artery disease, peptic ulcers, as well as lung cancer and other diseases associated with smoking habits can be reduced through early diagnosis and treatment, Dr. Hammond states.

A survey of smoking habits of 18,697 men and 24,371 women over the age of 30 showed "many different complaints" caused by smoking, he reports in the Archives of Environmental Health, Aug., 1961.

Smoking produces coughing, shortness of breath, loss of appetite and certain other complaints in susceptible individuals, Dr. Hammond found. These complaints sometimes have the effect of "inducing individuals to smoke less, inhale less, switch to low-nicotine cigarettes or give up smoking."

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METEOROLOGY

Huge Breaks in Ice Modify Antarctic Storms

▶ THE FIERCE STORMS that frequently lash the Antarctic continent are strongly influenced by broad expanses of open water along its coast.

Much of the energy of winter storms is tapped from the heat energy rising from these huge ice "holes," Russian scientist Dr. V. N. Kupetskiy of the State Oceanographic Institute, Leningrad, reports in a translation by the U. S. Joint Publications Research Service. These ice holes remain open for days or even months during the cold winter.

Nearly all tracks of winter storms studied ended abruptly in the regions of open water, the Russian scientist found. These swaths of open water, which frequently reach lengths of many hundred miles and a width of ten miles, exert a strong influence on the atmosphere's circulation.

Previously many scientists either ignored the effect of these openings or thought their significance was relatively minor, the scientist states. The open waters lose about 20 times more heat to the atmosphere than does the surrounding ice. This high amount of heat transfer is clearly seen by the low-lying clouds and fog frequently hanging over the area.

The Antarctic's winter storms occur during the Northern Hemisphere's summer months, since tilting of the earth on its axis creates opposite seasons in the two hemispheres.

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GEOCHEMISTRY

Carbon-14, Atomic Age Sleuth

Carbon-14 is the atomic sleuth tracing man's past and uncovering information about the earth and its atmosphere that may help foretell his future.

See Front Cover

➤ CARBON-14, the Sherlock Holmes of the atoms that has dated man's past, now is revealing the secrets of the earth from the depths of the oceans to the atmosphere.

The sleuthing talent of this element was discovered by Dr. Willard F. Libby, Nobelist at the University of California, Los Angeles, more than ten years ago.

Dr. Libby, then at the University of Chicago, discovered that carbon-14, a comparatively scarce isotope of natural carbon, is radioactive. This carbon isotope, with a half-life of about 5,600 years, is found in both plants and animals and after their death disintegrates at a steady rate. In other words, a body or fossil 5,600 years old would be half as radioactive as a currently living organism.

Tests using radiocarbon for dating were made by Dr. Libby and his collaborator E. C. Anderson on ancient artifacts of known age. The results were found to be remarkably accurate.

Carbon-14 also has been used for geological research. Radiocarbon dating has established the chronology of such geological events as the advances of the ice ages and the period of time between them and whether they occurred simultaneously in various scattered areas of the world.

Ice Age glacier advances are estimated by radiocarbon dating of stumps and fragments of trees destroyed by advancing glaciers such as the Tumbling Glacier in Mt. Robson, Canada, shown on the front cover of this week's SCIENCE NEWS LETTER.

Measures Water Sources

Available water supplies in arid zones also can be measured by radiocarbon dating of underground water to determine its age. This recent use of carbon-14 tracing is profoundly important to those who live in hot, dry climates. Water whose carbon-14 measure shows it to be young in age means adequate water. Such youth indicates that the underground reservoir is being adequately replenished by rainfall.

Aged or "fossil" water means a dwindling water supply and offers a sharp warning to inhabitants dependent upon it either to look for other water sources or begin organized water rationing.

Too little water is a danger to man's survival, too much also poses a threat. The rate at which the oceans now are rising on coastlines will give some indication of land that may be lost to man in the longer future. This may be revealed by a current study on the rate at which ocean waters submerged coastal forests some 4,000 years ago.

Radiocarbon measurements of ancient tree stumps and fragments still rooted in land now exposed by high tide in various coastal areas have been made by Prof. Charles J. Lyon, a Dartmouth College botanist.

His results show that it took 320 years for the ocean to rise one foot on New Hampshire's coastline at Odiorne Point, in contrast to only 51 years at Fort Lawrence and 62 years at Grand Pre. The last two in Nova Scotia are referred to as "drowned forest" sites.

According to Prof. Lyons, the ocean now is rising at about this same rate in these areas. For lifetime planning for the present generation, the study of ocean levels may not be important; but it will be vital to future generations.

Oceans' Mixing Rate Found

In oceanography, radiocarbon techniques have yielded the answer to the great question of the mixing rate of the oceans. Studies have shown that the Pacific mixes less rapidly than the Atlantic. In the Pacific, the turnover time between waters at the surface and those at great depths is between 1,500 and 2,000 years; in the Atlantic, it is about 750 to 1,000 years.

Radiocarbon dating also can measure the deep ocean currents. It has disclosed evidence for velocities and directions of the deep ocean currents in the Pacific that correspond to a requirement of some hundreds of years for the passage northward along the bottom.

In meteorology, carbon-14 tracing has shown for the first time clear and incontrovertible evidence of the world-wide circulation of elements and material in the atmosphere. This has had important biological implications by making it possible for scientists to determine the distribution and concentration of radioactive fallout from bomb tests. Thus the levels of strontium-90 and other harmful radiation from atomic testing now can be estimated with considerable accuracy.

The best dating techniques today require something like the discipline of surgery, Dr. Libby has said. "Cleanliness, care, seriousness, and practice" must be adopted by adequately trained personnel in order to assure obtaining radiocarbon dates that are consistent.

New techniques for radiocarbon dating are under development. With their advance and the subsequent increase in accuracy, new uses for carbon-14 in scientific research undoubtedly will develop. But its major use and greatest value undoubtedly will continue to be in revealing more of man's history, and thereby perhaps shedding new light on his future.

Written records of antiquity have been found in Egypt, in Asia Minor and in limited areas of Central America. But most ancient men did not write. Yet through the use of chemistry, scientists have been able to establish that people living 10,000 and more years ago had intelligence and capabilities that rival those of modern man.

The handiwork of the ancient Indians in North America, their basketry and skillfully made arrowheads, give evidence of their ability and skill. Among the most beautiful basketry of ancient man are the 300 pairs of sandals found in Fort Rock Cave in Oregon woven from grass rope, neatly stacked as those in a modern shoe store today. These sandals, 9,000 years old, are among the several thousand items traced back to their chronological origins by radiocarbon dating.

Radiocarbon dates also have established the existence of clashes between cultures of people who did not write or leave records. For example, the Neanderthal man and the Cro-Magnon man appear to have come on the world scene at the same time; but they did not remain together. The Cro-Magnon man survived the Neanderthal man, but how and why his survival occurred still is not known.

By radiocarbon dating, interesting and important details about ancient people have been discovered. An example of this was the successful correlation of the Babylonian calendar from the time of King Hammurabi with our own calendar, which Dr. Libby described in the journal Science.

The calendar of the Babylonians is a good one, but there appeared to be some conflict with the calendar in use today concerning the identification of a particular eclipse.

Dating Method Tested

Carbon-14 measurements were made on a portion of a house, about 4,000 years old, that was precisely dated by the Babylonian calendar. These provided a serious test of the limit of sensitivity and accuracy of the radiocarbon dating method. The sample of wood used for the testing came from a beam which bore a clear and legible date according to the Hammurabian Babylonian calendar.

The beam was divided into three equal portions, carefully measured over a period of three months, and the results then coordinated to get an answer as to which of the two most likely correlations of the Christian and Babylonian calendars was correct. The younger of the two possible calendars was strongly favored; the odds against the other being correct were about nine to one.

Radiocorban techniques by pinpointing past events in time may make it possible to drive back history into prehistoric periods now only guessed at and to more clearly describe the development of modern man.

To roll back the pages of history faster,

Dr. Libby and his associates at UCLA are working on a portable radiocarbon dater which will allow specialists to work in the field with archaeologists and geologists.

This will make it possible to excavate and utilize sites which now are little more than dark spots in some remote area, even though the dates obtained on the sites would not be as accurate as those which would be obtained in the laboratory.

The main advantage of the portable dater for archaeologists would be its use as a guide for digging. But its successful development, as Dr. Libby has pointed out, will permit "radiocarbon daters to go out and share, at least vicariously, in the great thrill of an archaeological dig."

• Science News Letter, 80:122 August 19, 1961

PHYSIOLOGY

Body's Master "Timer"

➤ THE HYPOTHALAMUS, a part of the forebrain containing vital nervous centers, functions as "the master timing signal generator" of the human body.

Dr. John Erskine Malcolm of the Postgraduate Medical School, London, reports nerve cells in the hypothalamus receive a pulse beat that starts in a circuit connecting arteries in the neck and brain, and is independent of the pulse from the heart. The pulse from this arterial circuit, called the circle of Willis, excites the hypothalamus cells and causes them to generate electrical impulses which are used by the brain as timing signals.

The hypothalamus, Dr. Malcolm contends, is therefore the timing device or "co-ordinating mechanism" that prevents interference between the pulse waves produced by the heart and those produced by the Willis circle.

He compares the action of the hypothalamus to that of a master timing signal generator used with radar equipment to enable the transmitter to take synchronized signals from both the generator and the receiver.

Signals or impulses travel from the hypothalamus to the heart by way of the involuntary nervous system. It now appears, Dr. Malcolm says, that the signals from the heart to the hypothalamus are actually heart sounds, conducted by the bones of the chest and spinal column.

The Willis circle is probably "the most important site in the body" at which these self-starting electrical vibrations occur, he states. A dilated portion of the internal neck artery apparently monitors blood pressure to assure "stable operating conditions" for the pulse-producing arterial circuit, Dr. Malcolm reports in Nature, 191:606, 1961.

• Science News Letter, 80:123 August 19, 1961

MATHEMATICS

Unified System Urged

➤ MATHEMATICS should be taught as a unified whole. Its "dead, useless, outmoded or unimportant parts" should be abandoned and replaced by a system that merges specific subjects to allow a smooth, gradual transition from basic principles to advanced work.

Drastic revisions in present teaching methods are needed to close the gap between secondary schools, which are 50 years behind the times, and universities, which have kept up with modern research and new programs in mathematics.

The conclusions were reached by mathematicians and educators from 18 nations that attended an international seminar. Their report has been issued by the Organization for European Economic Cooperation, Paris, sponsors of the 1959 meeting at Royaumont, France. It was written by Dr. Howard F. Fehr, head of the mathematics teaching department at Columbia University Teachers College in New York.

The new program would blend geometry and algebra as related subjects, taught from a fundamentally algebraic approach. The differences between the two would gradually disappear.

This would mean changing or replacing Euclid's traditional principles of geometry, taught for centuries. The theory is that all the Euclidean essentials can be learned "intuitively," at ages 11 to 13, by drawing, measuring, making models and investigating all useful facts.

From 13 to 15, the pupil would study deductive geometry — but not with the time-honored Euclidean triangles. Synthetic geometry would be replaced by a basic mathematics system using vectors, or real numbers. From the age of 15 on, geometry's established principles would be merged with algebra to promote a "gradual departure from physical reality to formal geometric abstraction and structure" by the time the student is ready for college.

Algebra itself would have much of its presently taught material weeded out. The solving of unnecessarily complicated problems is one of the factors that tends to clutter up the subject, the report said.

Trigonometry would not be taught as a separate subject, but as a part of the geometry-algebra mixture and later as a part of analysis.

Two new fields would be introduced at the high school level. They are elementary probability and statistical inference, which contribute to the "scientific method" basic to many modern fields.

New textbooks would, of course, be needed. Most of the countries also reported a need for more and better qualified teachers. Some are considering putting retired mathematics teachers back into service, or hiring retired scientists and engineers with teaching qualifications.

The countries represented were Austria, Belgium, Canada, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Sweden, Switzerland, Turkey, the United Kingdom and Yugoslavia, all organization members, and the United States, which sent four "guest experts."

• Science News Letter, 80:123 August 19, 1961

PHARMACOLOGY

Anti-Cancer Chemical Gets Clinical Trials

➤ A NEW CHEMICAL COMPOUND that slows up three types of mouse tumor is undergoing preliminary trials on humans, four scientists of Lederle Laboratories, Pearl River, N. Y., report.

Three kinds of cancer respond to oral doses of the drug, which is also effective by injection. The types are sarcoma 180, a common type of cancer, 6C3HED lymphosarcoma, a lymph gland tumor, and C3H mammary adenocarcinoma, a cancer attacking the breast glands.

The drug significantly prolonged the survival time of mice that had had transplants of mammary adenocarcinoma, but it was ineffective against "spontaneous" mammary adenocarcinomas.

Previously reported anti-tumor chemicals or "alkylating agents" act as bone marrow depressants, and the new Lederle chemical also diminishes the activity of bone marrow.

The chemical name of the experimental drug now being tried out clinically is N-(acrylamidomethyl)-3-bromopropionamide. Detailed results of evaluation studies of this and other anti-tumor chemicals will be published soon.

Drs. A. S. Tomcufcik, S. D. Willson, A. W. Vogel and A. Sloboda of Lederle Laboratories report in Nature, 191:611, 1961.

• Science News Letter, 80:123 August 19, 1961

GEOPHYSICS

Scientists Search for Nuclear Test Sites

➤ UNITED STATES Geological Survey scientists have been scouring the countryside searching for possible test sites for nuclear explosions. These sites would be used for peaceful or military testing purposes if and when nuclear testing is resumed.

Selection of the proper testing area is very important, Geological Survey scientist V. E. McElvey said. Contamination of surface or underground waters from a nuclear explosion is but one of the many possible hazards, he said.

Two of the sites already recommended to the Atomic Energy Commission are near the towns of Hattiesburg, Miss., and Carlsbad, N.M. Both locations contain thick underground salt layers that would be used to confine a nuclear explosion.

The Carlsbad site was chosen to explore the peaceful uses of the atom.

• Science News Letter, 80:123 August 19, 1961

• Books of the Week •

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

AEROSPACE FACTS AND FIGURES '61—Rudolf Modley and others; Ben S. Lee, Ed.—*Am. Aviation Publications,* 9th ed., 152 p., illus., paper, $2. Official compilation of statistical data by Aerospace Industries Association of America.

A BOOK OF PLANETS FOR YOU—Franklyn M. Branley—*Crowell,* 59 p., illus. by Leonard Kessler, $3.50. Designed to interest the young reader in the rotation of the planets.

CALIFORNIAN PLEISTOCENE PALEOTEMPERATURES—James W. Valentine and Robert F. Meade—*Univ. of Calif. Press,* 45 p., paper, $1. Ancient climate estimates made from evidence of paleoecology and oxygen isotope ratios.

CHAVANTE: An Expedition to the Tribes of the Mato Grosso—Rolf Blomberg, transl. from Swedish by Reginald Spink—*Taplinger,* 119 p., 71 photographs, maps, $7.50. The story of the first non-Brazilian expedition among the savage people of the Chavante territory, outstandingly illustrated, partly in color.

CLINICAL MEDICINE AND THE PSYCHOTIC PATIENT—Otto F. Ehrentheil and Walter E. Marchand, foreword by Joseph M. Hayman, Jr.—*Thomas, C. C.,* 383 p., illus., $10.75. Reference book for physicians, result of many years of observations, pointing out some of the special problems of the practice of medicine among psychotics who often do not complain of physical pain even with acute appendicitis and severe heart attacks.

THE CLOUDS—Roger Clausse and Leopold Facy, transl. from French by Joan Ferrante—*Grove Press,* 192 p., illus., paper, $1.35. Profusely illustrated and lively story of the why and how of different cloud formations and the study of water in the atmosphere.

COLUMBUS—Marianne Mahn-Lot, transl. from French by Helen R. Lane—*Grove Press,* 192 p., illus., paper, $1.35. The dramatic life of Columbus described against the background of his period, with quotes from Columbus' own logs and contemporary records.

CROSSED-FIELD MICROWAVE DEVICES, Vol. I: Principal Elements of Crossed-Field Devices. Vol. II: Principal Types of Crossed-Field Devices, Analysis of Oscillator System Performance, Regional Progress and Trends—E. Okress, Ed.-in-Chief—*Academic Press,* 648 p., 520 p., illus., $22, $18. Summarizes progress and state of the art in theory and practice.

DEEP SEA, HIGH MOUNTAIN—Elliott Roberts—*Little,* 275 p., illus. by Albert Orbaan, $3.75. True stories for young people, based on the work and experience of the men who work in the U. S. Coast and Geodetic Survey, written by geophysicist.

ECONOMIC PLANNING FOR BETTER SCHOOLS—Benjamin Handler—*Univ. of Mich., College of Architecture,* 107 p., $5. Based on pilot studies of school obsolescence, discusses school expansion needs by kind of city and region, economy through architectural means and capital budgeting.

EXPERIMENTAL NUCLEAR CHEMISTRY—Gregory R. Choppin—*Prentice-Hall,* 226 p., illus., $9.25. Combines basic theory with the latest techniques in the expert use of radioisotopes in modern research, describes experiments using license-free quantities of radioisotopes of low activity, thus eliminating special safety requirements.

FRUITS IN THE HOME GARDEN: A Handbook—George M. Slate, Ed.—*Brooklyn Botanic Garden,* 96 p., 80 illus., paper, $1. Leading authorities give advice to the amateur gardener on all phases of fruit culture.

FUNCTIONAL CIRCUITS AND OSCILLATORS—Herbert J. Reich—*Van Nostrand,* 466 p., illus., $12.50. Deals mainly with the theory, characteristics and applications of negative-resistance circuits and sine-wave oscillators.

FUN-TIME RADIO BUILDING—Joseph A. Smith—*Childrens Press,* 63 p., illus. by Robert Borja, $2.50. Gives step-by-step directions for boys to build their own radio equipment.

GLOSSARY OF ATOMIC TERMS—*AEA (Brit. Information Serv.),* 54 p., paper, 70¢. Glossary prepared by Technical Writers. Section of PR Branch of the U. K. Atomic Energy Authority.

I WANT TO BE A SCIENTIST—Carla Greene—*Childrens Press,* 32 p., illus. by Janet LaSalle, $2. Experiments with a handful of beans, gaily illustrated for beginning reader.

I WANT TO BE A SPACE PILOT—Carla Greene—*Childrens Press,* 32 p., illus. by Donna Cieslak, $2. Facts about space flight for beginning readers.

INTERSERVICE EDUCATION OF HIGH SCHOOL MATHEMATICS TEACHERS: Report of 1960 Conference—Kenneth E. Brown and Daniel W. Snader—*Off. of Educ. (GPO),* 108 p., paper, 50¢. Highlights of conference, key addresses, group work sessions and panel discussions on ways to improve the teaching of mathematics.

INTRODUCTION TO MATHEMATICS—Charles F. Brumfiel, Robert E. Eicholz and Merrill E. Shanks—*Addison-Wesley,* 323 p., illus., $4. Junior high school text emphasizing mathematical ideas rather than manipulative skills.

INTRODUCTORY TOPOLOGY—Stewart Scott Cairns—*Ronald,* 244 p., illus., $8.75. Text for a first course in topology on the advanced undergraduate and beginning graduate level.

KEY AUDIOVISUAL PERSONNEL: In Public School and Library Systems in States and Large Cities and in Large Colleges and Universities, 1960-61—Seerley Reid—*Off. of Educ. (GPO),* 101 p., paper, 35¢.

LIBERAL EDUCATION AND PHARMACY—James Newcomer, Kevin P. Bunnell and Earl J. McGrath—*Teachers College,* 125 p., paper, $2.75. Analysis of courses of study for pharmacy students during their undergraduate years.

MAN AND DOLPHIN—John C. Lilly, M.D.—*Doubleday,* 312 p., photographs, $4.95. Summary of experiments investigating the possibilities of interspecies communication, describing work conducted with dolphins, carefully documented and written in layman's language.

MAN'S CONQUEST OF THE STARS—Pierre Rousseau, transl. from French by Michael Bullock—*Norton,* 356 p., illus., $5. Epic of the discovery of the universe from primitive times to the present.

1961 MISSILE HANDBOOK—*Aircraft & Missiles (AMRI),* 3rd ed., 96 p., 40-page spring '61 updating, illus., paper, $2; incl. midyear and year-end updating, $4. Directory of missile and space projects, active R&D projects and contractors' directory.

THE OPTIMAL DESIGN OF CHEMICAL REACTORS: A Study in Dynamic Programming—Rutherford Aris—*Academic Press,* 191 p., $7. Supplementary text for graduate or undergraduate courses in chemical reactor design, also of interest to those engaged in the rapidly developing field of mathematical programming.

THE OSAGES: Children of the Middle Waters—John Joseph Mathews—*Univ. of Okla. Press,* 826 p., illus., $7.95. An Osage himself, the author presents in epic form the history of the Osage Indians, based on oral and recorded sources. Detailed index and bibliography included.

PIONEERS OF SCIENCE AND THE DEVELOPMENT OF THEIR SCIENTIFIC THEORIES—Sir Oliver Lodge—*Dover,* 404 p., illus., paper, $1.50. Reprint of authoritative, yet readable history of astronomy, from Copernicus to the tidal theories of Helmholtz and Lord Kelvin.

PSYCHOSOMATIC ASPECTS OF PAEDIATRICS—Ronald Mac Keith and Joseph Sandler, Eds.—*Pergamon,* 155 p., $8.50. Papers and discussions of Study Group of the Society for Psychosomatic Research, held at the Royal College of Physicians, May 1959.

RADIO MOSCOW AND THE WESTERN HEMISPHERE—Comments by Norman Brokenshire—*Cook,* 12" LP record, $4.95. Concise recording in English, of radio propaganda the Soviets beam to America and the world, including the Russian claim for supremacy in space and science—a sobering record of the contemporary war of words.

THE RANDOM HOUSE AMERICAN EVERYDAY DICTIONARY—Jesse Stein, Ed.—Random House, 570 p., illus., $1.95. Reprint, dictionary for quick reference, gives pronunciation, spelling, division and meaning of more than 60,000 entries.

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REPORT ON COOPERATIVE EDUCATION—Ralph W. Tyler and Annice L. Mills—*Edison Foundation*, 32 p., illus., paper, single copies free upon request direct to publisher, 8 W. 40th St., New York 18, N. Y. Summary of the two-year national Study of Cooperative Education.

REPORT ON THE NATIONAL DEFENSE EDUCATION ACT: Fiscal Year Ending June 30, 1960—*Off. of Educ. (GPO)*, 93 p., paper, 55¢. Summary of program administered by the Federal Government, including student loans, fellowships, and financial assistance for strengthening science.

RESEARCH ON THE ACADEMICALLY TALENTED STUDENT—Kenneth E. Anderson, Ed.—*NEA*, 92 p., paper, $1. Brings together information on past studies dealing with the academically gifted student and discusses research needs.

SANDPIPERS—Edith Thacher Hurd—*Crowell*, 35 p., illus. by Lucienne Bloch, $2.35. Appealing life-cycle story for the youngest readers.

SCIENTIFIC RESOURCES IN THE WASHINGTON D. C. AREA: 1961-1962 Directory—Gordon Kennedy, Jr., Ed.—*Metropolitan Washington Science Bureau*, 62 p., paper, $2. First complete guide to the area's scientific organizations, documentation centers, research and development facilities, both private and government.

A SELF-CONSISTENT FIELD THEORY OF QUANTUM ELECTRODYNAMICS—Mendel Sachs and Solomon L. Schwebel—*Lockheed (OTS)*, 51 p., paper, $1.50. Theory rejects photon as an elementary particle, replacing it by a state of the particle-antiparticle pair.

SENSORY COMMUNICATION: Contributions to the Symposium on Principles of Sensory Communication, 1959, M.I.T.— Walter A. Rosenblith, Ed.—*Wiley*, 844 p., illus., $16. Presents experimental results and theoretical considerations from a variety of disciplines.

SOVIET POLICY TOWARDS INTERNATIONAL CONTROL OF ATOMIC ENERGY—Joseph L. Nogee—*University of Notre Dame Press*, 306 p., $6.50. Presents fully documented account of Soviet Union's atomic energy policy as reflected in the negotiations, 1945-1960, and discusses the apparent objectives of Soviet negotiating tactics.

SPACE TRAVEL GUIDEBOOK: An Intimate Glimpse into Man's Conquest of Flight—Robley D. Stevens—*Wilde*, 148 p., illus., $4.50. For the general reader.

TRIG, LOG, ANTILOG AND LOG OF TRIG FUNCTIONS SIX PLACE TABLES—C. Attwood—*Ottenheimer Publishers*, 192 p., indexed, $1. Vest-pocket guide to six-figure trigonometrical, logarithmic, antilogarithmic and logarithmic trigonometrical tables and formulas.

THE TRUE BOOK OF HORSES—Elsa Posell—*Childrens Press*, 48 p., illus. by Betsy Warren, $2. Informative book for the very young reader.

VOLUNTARY HEALTH AND WELFARE AGENCIES IN THE UNITED STATES: An Exploratory Study by an Ad Hoc Citizens Committee—Robert H. Hamlin, Dir.—*Schoolmasters' Press*, 88 p., paper, $1. Findings and recommendations of study supported by the Rockefeller Foundation.

WEED CONTROL: As a Science—Glenn C. Klingman with Lyman J. Noordhoff—*Wiley*, 421 p., illus., $8.50. Up-to-date textbook, written in readable form, presents a thorough review of the chemistry of various herbicides, their physiological effects, and applied phases of weed control.

WHO'S WHO OF AMERICAN WOMEN: A Biographical Dictionary of Notable Living American Women, Vol. II—*Marquis*, 2nd ed., 1,114 p., $25. Some 20,000 condensed biographical sketches of American "women outstanding as women": educators, civic workers, club women, as well as professional women, artists and authors.

• Science News Letter, 80:124 August 19, 1961

GENERAL SCIENCE

News From Science Clubs

➤ A STEADY FLOW of reports on interesting, worthwhile club projects is being received by Science Clubs of America. SCA's headquarters office at 1719 N Street, N.W., Washington 6, D. C., welcomes news of what YOUR club is doing.

THE SHELDON, IOWA, Community High School Science Club tried a successful "first" this year by sponsoring an Open House for public inspection of the school's science departments. Visitors totaled 300.

THE MIDLAND, LA., High School Science Club conducted a school-wide campaign to determine each student's blood type and record the data gathered.

THE BIOLOGY Science Club of Holy Family High School, Birmingham, Ala., took a trip to the Tuskegee Institute, Tuskegee, Ala. They visited the George Washington Carver Museum, the laboratories in the Carver Foundation building and the Institute's general science building.

SCIENCE EXHIBITS have been placed on display at the public library and at P.T.A. meetings by members of the Disque Junior High School Science Club in Gadsen, Ala.

A PROGRAM to promote college preparatory studies at Creswell, Ore., High School was undertaken by that school's Science Club.

IN FULTON, MISS., members of the Fulton Junior High School Science Club have been compiling various collections for the school museum.

"SCIERAMA," a science exposition, is cited as one of the well-received activities of the Crusader Science Club at Central Catholic High School, Canton, Ohio.

THE MOTTO of the Coronado Junior High School Science Club in Plainview, Texas, is "Inquiring Minds Conquer the Future."

THE BIOLOGY CLUB at San Fernando, Calif., High School labeled the trees and shrubs on the school campus.

A MAJORITY of the 62-member Beverly Hills, Calif., High School Medical Club expect to study medicine at college. Practicing physicians in the Beverly Hills area frequently meet with the group and serve as guest speakers. Films on surgical procedures are another popular meeting feature.

SCIENCE TEACHERS, youth leaders and others interested in starting and sponsoring clubs can get complete details from Science Clubs of America, 1719 N Street, N.W., Washington 6, D. C.

There is no charge for these materials, or for affiliating a club with SCA.

• Science News Letter, 80:125 August 19, 1961

Questions

CHEMISTRY—At what temperature does the new tantalum carbide filament burn? p. 115.

MEDICINE—How many percent of all deaths in 1959 were caused by diseases of the heart and circulatory system? p. 116.

PUBLIC HEALTH—What is the "cure" for earache from chewing gum with only one side of the mouth? p. 117.

Photographs: Cover, Canadian National Railways; p. 115, Hooker Chemical Corporation; p. 117, F. C. Livingstone; p. 118, U. S. Forest Service; p. 119, United Technology Corporation; p. 128, Goode Products Co.

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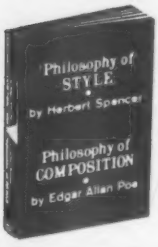

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8-19-61

INVENTIONS

Patents of the Week

A method for exploring oil reserves in the continental shelf of U. S. coasts has been patented. Among other inventions was a lower cost, frostless refrigerator.

➤ A METHOD for exploring the tremendous oil reserves locked in the continental shelf skirting the United States coast has been patented.

William B. Huckabay, Dallas, Texas, won patent No. 2,994,397 for a seismic method that gives a continuous "picture" of the earth layers underlying the ocean bottom. Rights were assigned to Socony Mobil Oil Company, Inc., New York City.

The exploration method uses sound waves sent out from a boat cutting a series of grids on the ocean waters. A combustible gas mixture within a tube is ignited, sending a slug of compressed gas toward an underwater outlet on the boat. A sudden impact at the tube's mouth converts the energy into sound waves.

The continuous stream of sound waves bounces off the various earth layers and echoes are picked up by a detector towed behind the boat. The frequency of the sound pulses can be controlled by changing the richness of the combustible mixture, the patent claimed.

A continuous seismic survey considered impractical before is now possible, Mr. Huckabay emphasized. This new source of acoustic energy also makes possible different kinds of seismic surveying over the earth's surface.

A "lower cost frostless refrigerator" containing below and just above freezing compartments was patented by Leonard J. Mann, Edgar C. Robbins, and Clifford H. Wurtz, Dayton, Ohio. Rights of patent No. 2,994,209 were assigned to General Motors Corporation, Detroit. "No frost forms in either the below or above freezing compartments" due to the presence of dead air space within the refrigerating walls, the patent claimed.

A pocket dosimeter carried by persons working with radiation has been invented. Donald P. Jones and Heinz F. Nitka, Binghamton, N.Y., received patent No. 2,994,771, assigned to General Aniline & Film Corporation, New York City. Radiation at higher energy levels is converted to light by a fluorescent crystal, coloring a sensitive paper in the dosimeter. The color is then compared with a standard "chart" of colors representing different levels of radiation.

A warning device telling a boat operator a water skier is in trouble won patent No. 2,994,861 for Malcolm T. Reinhardt, Jr., Lubbock, and Joe B. McElmurray, Nolan, Texas. Merely by pressing a button on the tow rope handle, the water skier lights up a warning signal on the boat's dashboard. Collisions with other boats or skiers, which frequently happen when a boat operator turns to keep an eye on the skier, are avoided, the inventors stated.

A refrigerated display case whose doors open automatically when a customer reaches for a succulent meat or other refrigerated food was patented by Willard L. Morrison, Lake Forest, Ill., who assigned rights of patent No. 2,994,572 to the Union Stock Yard and Transit Company of Chicago. The customer's reaching hand breaks a photoelectric light beam, causing the door to open. By withdrawing the hand, the door again closes to prevent cold air from escaping.

A television "eye" that scans file cards for persons in other rooms was patented by Robert D. Conkwright, Bronxville, and Warren D. Novak, Chappaqua, N. Y., who assigned rights of patent No. 2,994,740 to General Precision, Inc. A librarian or file clerk places the desired drawer of cards at the base of the TV unit, and the camera relays the information on each card to the viewer.

A substitute for leather was patented by James S. Proctor, Grand Island, N. Y., who assigned rights of patent No. 2,994,617 to E. I. du Pont de Nemours and Company, Wilmington, Del. The porous plastic material is supposedly scuff-resistant and flexible.

A toy figure with movable feet was invented by Herbert R. Beebe of Richmond Hill, N. Y., and Richard Harvey of Hollis, N. Y. Rights of patent No. 2,994,157 were assigned to American Doll & Toy Corporation. Children playing with the doll can adjust the feet for different shoe types.

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NATIONAL GEOGRAPHIC MAGAZINES, 1888-1960, any issue. Periodical Service, Box 465-SN., Wilmington, Delaware.

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EDUCATION

AEC Training Hundreds Of Atomic Specialists

▶ MORE THAN 1,200 nuclear scientists and engineers working on educational and applied atomic energy projects in some 50 countries received their specialized training in these fields at the Argonne National Laboratory, Argonne, Ill., or the Oak Ridge National Laboratory, Oak Ridge, Tenn., both operated for the U. S. Atomic Energy Commission.

The advanced courses in reactor technology, engineering research and development, and administration and operation of nuclear facilities are offered to participants with backgrounds in traditional physical science and engineering. Research appointments also are available to established research scientists who wish to carry on work in life science or physical science.

To meet the international demand for trained nuclear scientists and engineers, the AEC established the International School of Nuclear Science and Engineering in 1955 at Argonne. As universities and other institutions in the United States and abroad developed programs to provide basic nuclear training, the name of the school was changed to International Institute of Nuclear Science and Engineering and the program of advanced training and research was set up. Argonne is operated for the AEC by the University of Chicago.

The Oak Ridge School of Reactor Technology has been operated by the Union Carbide Nuclear Company for the AEC since 1950. Year-long programs in reactor operations supervision and hazards evaluation are offered each fall.

Although both programs were designed principally for students from abroad, they also are open to U. S. citizens.

• Science News Letter, 80:127 August 19, 1961

ELECTRONICS

"Building Block" Concept In New Data Transmitter

▶ THE "BUILDING BLOCK" approach to high-speed communications is used in a new system for simultaneous transmission of digital information from as many as 16 different sources.

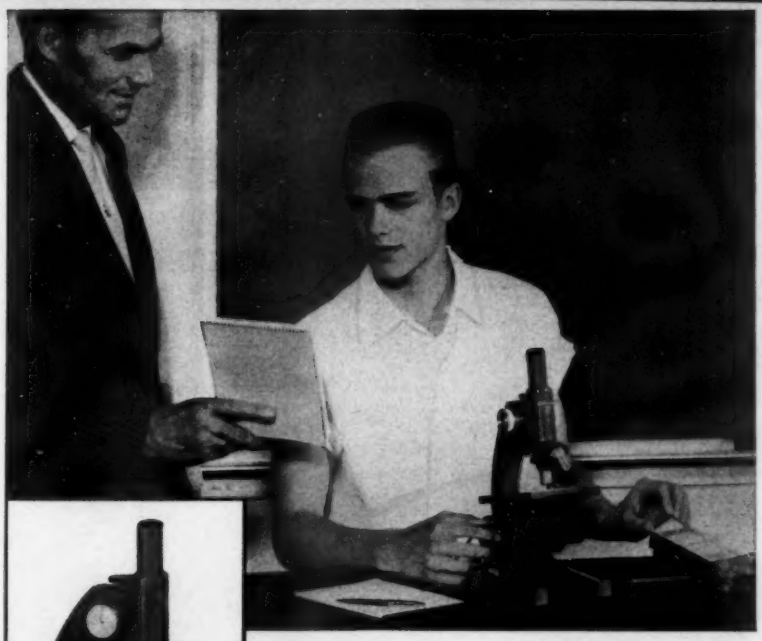
Teletypewriters, data transceivers, facsimile machines and tape machines can feed information into the system for long-distance travel over a standard telephone line.

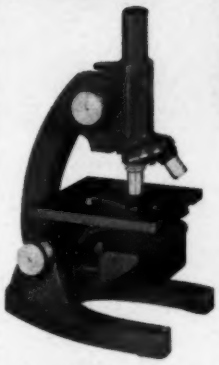
Top speed is 4,800 bits (600 characters) per second. At their destination, the messages are unscrambled by similar equipment.

Each block, or functional nodule, is an assembly of plug-in, printed-circuit logic cards. Both blocks and cards are interchangeable. The system can be enlarged or revised as the user's communications requirements change.

Developed by ACF Electronics, Riverdale, Md., the system is called "ABCD," for ACF Building Block Communications Devices.

• Science News Letter, 80:127 August 19, 1961





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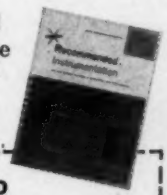

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• New Ideas and Gadgets •

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CHARCOAL FIRE HOLDER of wire mesh holds charcoal in a compact vertical pile to permit free circulation of air that speeds up starting and insures even burning. The holder is placed in the grill, charcoal and lighting fluid poured in, then lit. When charcoal burns with even red glow, the holder is lifted off and coals spread out.

• Science News Letter, 80:128 August 19, 1961

INSTANT-COFFEE SET of white ceramic decorated with a rooster design includes a 6-inch-high coffee jar with spoon, a sugar bowl with built-in stainless steel spoon and a creamer, both 4½ inches high.

• Science News Letter, 80:128 August 19, 1961

HIGH INTENSITY LAMP that rests on a base only slightly larger than a pack of cigarettes gives glare-free concentrated light. The fold-away lamp has a miniature, cork-insulated reflector of 2½-inch diameter. It has an electrical outlet for small electrical tools and appliances.

• Science News Letter, 80:128 August 19, 1961

COMPACT COT, shown in the photograph, folds to a size small enough to stow in a bureau drawer or pack in a suitcase and comes in a handy carrying carton. It unfolds to 6 feet 3 inches long and 26 inches wide. The cot, ideal for camping trips, weighs only four pounds and features a springy all aluminum frame with a washable green cover of heavy duck.

• Science News Letter, 80:128 August 19, 1961

COLOR SLIDE RULE demonstrates components of different colors. A teaching device for classroom demonstrations in high school and college physics, the versatile rule consists of a stationary holder with four filters, four corresponding color-coded spectrographic diagrams, and a slide with another set of four filters and diagrams that moves within the holder. Complete rule fits into standard lantern slide projector for use in large lecture rooms.

• Science News Letter, 80:128 August 19, 1961

FOLD-AWAY GARDEN CART that snaps flat for storage combines a flexible steel sheet with a strong fabric bag having a capacity of six cubic feet. Weighing only 18 pounds, a dust pan lip makes it easy to sweep into.

• Science News Letter, 80:128 August 19, 1961

CURLY COMB follows the natural contour of wave and curls, adding longer life to a hair set. The comb is made of clear lucite with two rows of curved teeth and is equally good for fine or thick hair.

• Science News Letter, 80:128 August 19, 1961

WALL HAT RACK of plastic is attached to any wall instantly, without nails or screws, by a strong adhesive which is furnished in individual capsules. Complete instructions included with each unit.

• Science News Letter, 80:128 August 19, 1961

Nature Ramblings

➤ THE LEAVES of the ginkgo tree soon will be turning a brilliant yellow, just as they have for countless autumns.

In a sense, the ginkgo is a living fossil. During the 100 or 200 million years of its known existence, while other plants were modified drastically or disappeared, the ginkgo not only persisted but changed very little.

At one time during its history, *Ginkgo biloba* was native to North America, but today only the petrified remains of these trees, not the living offspring can be found.

The trees living at the present time are believed to have originated in northern China. No one knows how long it has been since a ginkgo survived in the wild state, and if the trees had not been cultivated by Chinese Buddhist priests and monks, to whom they were sacred and worthy of a place near a temple, they might be extinct by now.

The Japanese also held the tree in respect. Such an honor is not surprising, for the ginkgo is unique among trees and has no close relatives.

The leaves are leathery and fan-shaped, and the veins run directly from the leaf stalk to the outer leaf edge. There is no prominent mid-vein as is the case with most familiar leaves.

Ginkgo

Thousands of ginkgos have been planted in Washington, D. C., Baltimore, Los Angeles and New York. For some reason, they suffer little damage from city grime, storms, fungi and insects.

The female ginkgo bears a thin-skinned plumlike fruit. Oriental peoples consider the large, smooth silvery-white pit of the fruit a delicacy when roasted. But the flesh has a nauseating, rancid-butter smell, and when such fruits drop to the ground in autumn and make city sidewalks a slippery, smelly mess, the female ginkgo falls into disfavor. The fruitless male tree, however, is still quite popular.

• Science News Letter, 80:128 August 19, 1961

Do You Know?

It has been found that the use of *silage* in addition to hay, when fed in the proper amount, stimulates the milking cow to produce more milk.

Splitting, cracking, ridging, laminating or excessive brittleness of the *fingernails* can be prevented or alleviated in a majority of cases by the daily ingestion of a given amount of gelatin.

Congenital defects of the *heart* are by far the leading cause of heart disease mortality among whites under age 15, and rank only slightly below rheumatic heart disease at ages 15 to 24.

Approximately $19,900,000 will be expended in fiscal year 1962 in a new *research* program adopted by the Atomic Energy Commission for high-temperature materials and high-performance reactors.

There are approximately 255,000 passenger *elevators* in operation in the United States, and they transport nearly 41 billion passengers per year over a distance exceeding 138,000,000 miles.

• Science News Letter, 80:128 August 19, 1961